Pediatric1

General Assessment	
FLACC - 2pts each	0-2 : Face:----------no expression = 0 grunting, moaning, grimace = 2 0-2 : Leg:---------- relaxed = 0, kicking/drawn up =2 0-2 : Activity:---------- quiet = 0, rigid/jerking = 2 0-2 : Cry:---------- no cry = 0, steady / scream= 2 0-2 : Consolability:---- content = 0, difficult to comfort =2 - 1-3 = mild pain - 4-6 = moderate pain - 7-10 = severe discomfort
Head / Neck	- Small, nontender, movable nodes are usually normal Shape and symmetry Fontanel: posterior closed by 2 months Anterior closed by12- 18 months Palpate all cervical chain lymph (supraclavicular is ALWAYS BAD) - Hyperextension with pain on flexion can be meningeal irritation.
Cranial nerves	1 - olfactory 7 - facial 2 - optic 8 - auditory 3 - oculomotor 9 - glossopharyngeal (gag) 4 - trochlear (down & out) 10 - vagus 5 - trigeminal 11 - accessory mscl 6 - abducens (temporal) 12 - hypoglossal (move tongue)
Eyes	PERRLA Corneal reflex (touch & eye should move/blink) Extraocular movements
Ears / Kidney	Develop at same time in utero. Can be indicative of renal malformation
Lung / Chest	Apex above clavicle, Base @ 7th rib Accessory muscle use? Pectus Excavatum : funnel chest Pectus Carinatum : protruding chest
Heart PMI	<7 : 4th intercostal space, midclavicular >7 : 5th intercostal space, midclavicular
Fluid Balance	Newborn ~ 75% total body weight (45%ECF) Infant ~ 65% total body weight (25% ECF) Child / Adolescent ~ 50% total body weight (10-15% ECF)

Pediatric2

Failure to Thrive (FTT)	Normal growth that develops into Growth failure (a curve that crosses >2% on standard chart) - Organic: medical condition, inadequate intake, inadequate absorption, ^metabolism, defective utilization (genetic) - Nonorganic: environmental (low intake)
MGMT for FTT	Primary: reversal of cause - Add calories through diet and supplementation - Multidisciplinary care
Nursing Care for FTT	*Accurate weight, height/length, head circumference measurement.** - Observe & document feeding & child/parent-interactions
Food and Age	Solid Foods begin ~4-5 months. Less likely to be allergic to rice ceral
Stages & play	2yrs = parallel play (side by side but not together) 4 yrs = associative play Solitary play? Aggressive play?
Erikson Stages	Trust vs mistrust: 0-12months. Autonomy vs shame: 1-3yrs. Learns self-control Initiative vs guilt: preschoolers (3-6yrs). Evaluate own behavior. Fearful of strangers Industry vs inferiority: 6 - 12 yrs (school age). Self confidence. Failure = self-doubt & insecurity **Identity vs Role Diffusion:** 12 - 20 yrs (adolescence) Positive outcome: a coherent sense of self; plans for future work/education Negative outcome: inability to develop personal/vocational identity
Piaget's stages	Pre-operational: 2-6 yrs. Begins to use symbols but can't reason logically Concrete operational (7-12 yrs): take perspective of others, reversible thinking, inductive logic Formal Operational: >12 yrs.
Developmental milestones	Looses doll-eye reflex (2-3 months) Drooling (4 months) Responds to own name (6-8 months) Takes deliberate steps when standing (9-10 months) Picks up bite pieces of cereal (11 months)
Metabolic & Endocrine	
Fever	Normal range 36.4 - 37 (97.5 - 98.6): >100.4 = febrile antipyretics: **Ibuprofen** ● Aspirin should not be administered due to risk of Reye's Syndrome

Fluid Balance	Newborn ~ 75% total body weight (45%ECF) Infant ~ 65% total body weight (25% ECF) Child / Adolescent ~ 50% total body weight (10-15% ECF)
Dehydration	Intervention: monitor mucous membranes, ∆'s to I&O's Mild / moderate / severe weight: 3-5% / 6-9% / ≥10% Pulse: norm / ^ slight / ^ very RR: norm / ^ slight / hyperpnea BP: norm / norm - orthostatic / orthostatic - shock Hypotonic dehydration: electrolyte loss exceeds water loss. Must assess urine output before giving KCl
Diabetes Mellitus	**Assess**: Polyuria /polydipsia /polyphagia, hyperglycemia, enuresis in school aged child, FTT **Exercise**: 10-15g carbs for every 30-45 min of planned activity. ● Check insulin before exercising and plan exercise for an hour after eating. ● Do not exercise if BGL <100 **Insulin**: HbA1C less than 7% is good. Illness, infection, & stress increase need for insulin.
Interventions for hypoglycemia	Hypoglycemia is BGL <70mg/dL Rapid releasing glucose followed by complex carb & protein ● Fruit juice, milk Unconscious child: glucose paste on gums & retest BGL after 15lucagon may be necessarymin ● IM glucagon
Phenylketonuria	Genetic disorder → CNS damage from elevated phenylalanine **Assessment**: digestive problems, seizures, musty odor to urine **Interventions:** rescreen babies @ 14 days if initial was done before 48hrs
GI Disorders w/ Peds	
Vomiting	Think dehydration. Does the pt have diarrhea as well? For how long? **Infant**: how many wet diapers are baseline? → how many is the child having now?
Hirschsprung disease etiology	Absence of ganglion cells in affected area resulting in lack of nervous stimulation. - Usually in distal portion of colon / rectum - 4x more common in males than females *most severe complication is enterocolitis: fever, GI bleed, explosive watery diarrhea Infant = failure to pass meconium, refusal to suck Children = FTT, ribbon-like & foul-smelling stool

Pediatric4

Hirschsprung disease Mgmt	Fluid / E- balance : monitor I&O. maintain low-fiber ^calorie ^protein diet Bowel Prep Surgery. Single stage = no colostomy. 2 stage = temp ostomy - Complication = bowel perforation, colitis Teaching: stoma should be red & moist
Intussusception	Telescoping of one portion of bowel into another Assessment: colicky abd pain, draws knees to chest. Currant jelly-like stools containing blood & mucous. Intervention: monitor for perforation. Normal brown stool = resolved
Omphalocele	Herniation of gastric sac through umbilical ring. Immediately after birth sac is covered with sterile gauze soaked in NS & covered w/ plastic wrap to prevent moisture loss ● Monitor for S&S of infection & temp (heat loss from sac) Stage reduction can take up to 12 months to complete
Malabsorptive syndromes	Lactose intolerance Celiac disease Short bowel syndrome
Lactose Intolerance	Congenital: very rare. Primary: malabsorption of lactose Secondary: dmg to intestines due to disease or infection Developmental: preterm infants - S&S: ~1hr after eating. Abd pain, bloating, flatulence
Celiac disease	Atrophy of villi in small intestine. Unable to digest gluten → mucosal damage and malabsorption - Impaired fat absorption (steatorrhea) Symptoms appear in 1-5yr range.
Hypertrophic Pyloric Stenosis	Thickening of sphincter → narrowed opening. CLASSIC FINDING: olive shaped mass in epigastrium just right of umbilicus - S&S: Projectile vomiting, weight loss, dehydration, peristaltic waves across epigastrium during/after feeding
Hypertrophic Pyloric Stenosis MGMT	Laparoscopic Pyloromyotomy - Maintain patency of NG tube - Begin feeding 4-6hrs after surgery or as prescribed, burp freqntly
Celt Lip/Palate	**Cleft Lip:** Failure of maxillary process to fuse with nasal elevations *cosmetic*.. 1 in every 600 live births - Goal is to minimize deformity **Cleft Palate:** Failure of hard & or soft palate to fuse - Feeding, speech, dental issues **Interventions**: support breastfeeding, maintain airway, protect suture site from repair. modify feeding technique, hold infant upright & direct formula

	to side/back to prevent aspiration. Keep suction bulb syringe close **Repair**: avoid positioning on side of repair or prone or placing objects in mouth. Encourage parent to hold the child.
Esophageal Atresia	Esophagus terminates before reaching the stomach ● blind pouch or fistula **Assessment**: frothy saliva in mouth/nose. **Coughing, choking, cyanosis** **Intervention**: keep >30* to prevent aspiration. NG/OG tube to minimize regurg preop. Postop - monitor for infection, I&O,
GERD	Assessment: passive regurg or emesis. Poor weight gain. Intervention: assess amount & characteristics of emesis (ie. BLOOD) Assess vomiting & times of feeding Assess for dehydration Diet: burp infant frequently & handle minimally post feeding - NG tube may be prescribed for severe regurg w/ poor growth - For toddlers feed solids first then liquids
NCLEX steps for any poisoning	1. ASSESS CHILD 2. Terminate exposure to poison 3. ID poison 4. Take measures to prevent absorption of poison 5. Document findings, type of poison, Tx measures & child's response think ABC's first and don't withhold CPR if necessary
Lead Poisoning	Affects every system, but CNS = most serious consequences. Most common cause is ingestion or inhalation Universal Screenings for 1-2YO Blood levels ≥70 BLL(µg/dL) = immediate care[1]. ● NCLEX class says < 9mcg Always ABC's first. Treat child, not the poison. Milk = best fluid to give
Acetaminophen Poisoning	Seriousness = Dosage Ingested * Time : [1]Gastric Lavage, [2]Charcoal, then [3]Mucomyst Antidote: N-Acetylcysteine (mucomyst) ● Give with juice/soda
Acetylsalicylic Acid Poisoning (aspirin)	Severe toxicity = 300-500mg/kg Interventions: activacted charcoal, IV $NaHCO_3$, vit K if bleeding, o2 GI: N/V (hypokalemia, hypoglycemia, metabolic acidosis), thirst CNS: hyperpnea, confusion, tinnitus
Renal with Peds	
The classic manifestations of nephrotic syndrome include: ****massive proteinuria, hypoalbuminemia, edema** The most useful & effective way of assessing fluid balance is: ****measuring daily weights**	

[1] https://www.usa829.org/Portals/0/Documents/Health-and-Safety/Safety-Library/Lead-Effects-on-Adults-&-Children.pdf

Pediatric6

By what age should children be able to control voiding: **5 years old**
The nurse would expect to note what in a child suspected of having glomerulonephritis: ****brown-colored urine**

S/S	Acute GlomeruloNephritis	Nephrotic Syndrome
Strep	E Present	E Absent
BP	E Elevated	E Normal or ↓
Edema	Periorbital, then peripheral severe	E Generalized
Proteinuria	Mild-Moderate	E Massive
Hematuria	E Gross	None/Micro
Peak Age	5-7 yrs.	2-3 yrs

Nephrotic Syndrome: results when glomerulus is excessively permeable to plasma protein → low plasma albumin & edema. Dietary restrictions are key to managing edema (sometimes requiring diuretics).**DAILY WEIGHTS**. Instruct parents to test urine for protein. Tx usually with steroids (prednisone 2mg/kg BID)
GlomeruloNephritis: Monitor I&O + Daily weights. Instruct parent to report bloody urine

Hemolytic-Uremic Syndrome	Most common cause of acquired acute renal failure in children. Usually between 6 months - 5 years. Most commonly E. coli, associated with coxsackie virus, echovirus, adenovirus. Primary site is the endothelial lining of small glomerular arterioles **Assessment**: Triad of Anemia, thrombocytopenia & kidney failure. **Interventions**: Hemodialysis or PD, strict I&O's
Bladder Exstrophy	Congenital anomaly. Bladder outside of body through lower abd wall **Interventions**: prevent bladder from drying, apply sterile non-adherent gauze. **DON'T APPLY PETROLEUM JELLY** can damage mucosa.
UTI	Upper tract is usually symptomatic: fever, chills, flank pain Lower : often asymptomatic Cystitis: inflammation of bladder. Pyelonephritis: upper + kidney >2YO = "classic" symptoms. Enuresis (incontinence in previously potty-trained), foul smelling urine, frequency, dysuria
VesicoUreteral Reflux	Retrograde flow of urine from bladder toward kidneys which can result in infection, renal scarring & kidney damage. Primary: congenital anomaly Secondary: abnormally ^pressures in bladder (UTI or Obstruction) Grade 1-5 (worst) **Tx**: re-implant ureters, lengthen submucosal segment (**PAINFUL!!!)** **Nrsng**: educate regarding hygiene, siblings are @ risk, S&S of UTI, **Nrsng Post surgery**: monitor UOP, pain control, ABX therapy
Epispadias & Hypospadias	Epi: located on dorsal surface Hypo: below the glans of the penis on the ventral side Circumcision is not performed on these patients *skin is used for repair*

Respiratory - Peds

A child presents to the ED with pleuritic chest pain related to pneumonia, what should the nurse do?

- Lay the child on the affected side to reduce pain associated with pleural rubbing

How should a new mother position her infant to decrease risk of SIDS

● Back rather than on stomach What should the ED nurse look out for in a child diagnosed with epiglottitis? ● Tripod positioning, chin thrust out, nasal flaring, accessory muscle use, presence of stridor	
Anatomical Variations	Smaller upper & lower airways = small amounts of stuff (mucous, FBAO..) Less compensatory reserve (fewer, smaller alveoli) Rely on **<u>diaphragm to breathe</u>** Epiglottis is floppy & trachea is shorter Tongue is larger in relation to nasal/oral passages Metabolic rate 2x Adult = fatigue w/ resp, ^O2 needs, hypoxia occurs more rapidly
Infection rates & AGE	• < 6 months still have maternal antibodies - 3-6months see ^ in infections • Toddler / preschool: ^ rate of viral infection • ≥5 years increase in B-strep & mycoplasma pneumonia Immunity ^'s with age and RR decreases.
Norm RR	----- NEVER GIVE water when RR >60 ------- 1-11 months: ~ 30 breaths 2-4 years : ~ 24 breaths 6-12 years : ~ 20 breaths >12 years : ~14-18
RR Red Flags	≥2 months: >60 2-12 months: >50 1-5 yrs : >40 5-12 yrs : >30 ≥12 yrs : >20
Kids have ^ susceptibility to resp dysfunction	EXPOSURE TO 2nd HAND SMOKE: More frequent infections, ^risk of otitis media, ^ risk of reactive airway disorders
Impaired Gas Exchange In children	*** LOC ***, restless / anxious - Cyanosis is a late sign and indicated significant hypoxia ≥50%
Stridor	Upper airway, gaspy high pitch. ● Coup, Foreign Body Airway Obstruction, Epiglottitis ●
Wheezing	Lower upper airway obstruction ● Reactive Airway Diseases, bronchiolitis
Decreased BS	Airway obstruction ● Pneumothorax, pleural effusion, atelectasis
Grunting	Early closure of glottis (inflammation or pending obstrctn) ● Severe resp distress

o2 therapy	~4 % / L of o2 increase. Room air = 21 % 4 lpm = ~37% o2
Acute Epiglottitis	Most common in children 2-8 yrs. Considered emergency because it can → severe resp distress. **S&S**: **absence of cough, ∆ in LOC, Drooling**, inspiratory ***stridor**, hypoxia, tripoding, retractions ● Sudden high fever (103+), sore, red inflamed throat, dysphagia ● H. influenza most common Dx: x-ray showing enlargement (thumb sign) Tx: steroids, antibiotics, decrease stress to child << stress can ^ chance of obstruction>> **Nursing**: DONT LEAVE THE CHILD. dont measure oral temp, avoid supine position. Ensure child is up to date on immunizations **Prevention**: Hib (influenzae type B) vaccine
Acute LaryngoTracheoBronchitis aka Croup	Generally affects < 5 yo. Preceded by upper resp. Infection - RSV, parainfluenza virus (most common), m. pneumoniae, influenza A & B S&S: **inspiratory stridor**, suprasternal retractions, **seal-like** cough **worse at night**, nasal flaring & accessory mscls Dx: steeple sign (bilateral swelling that leads to occlusion) Tx: dexamethasone, **cool humidified o2** (open window at night or air from freezer), nebulized epinephrine, heliox (helium/o2 mixture) **NRSNG**: ****isolation precautions** should be implemented until cause is known
Respiratory Syncytial Virus **--- bronchiolitis ---**	Commin on < 1 yo. Spread by ****direct contact w/ secretions** **S&S**: wheezing, coughing, fever, tachypnea, retractions **Tx**: symptomatic mgmt << suction >> ● good handwashing (CONTACT precautions) **NRSNG**: isolation or in room with other RSV children. Nurse only to RSV patients. NOT AIRBORNE, so just good handwashing and no mask required. Bed elevated to 30-40*. **Prevention**: Synagis (gamma globulin prophylaxis) *VERY EXPENSIVE*
Reactive Airway Disease **--- asthma ---**	Chronic inflam disorder, **episodic but reverses** with Tx Allergic rnx → mast cell release & bronchoconstriction / obstruction. Chronic: associated with allergy → late childhood / adult. Associated with girls who develop obesity & early onset puberty ● Status Asthmaticus: distress despite vigorous tx = EMERGENCY
Asthma : Dx	Pulmonary function tests - Peak flow measure: measure expiration well & sick - If peak flow is lower during sick time → ^med Tx

	● 80-100% (green) ● 50-79% (yellow - breathing Tx required) ● ≤49% = send to **ER!!!** Categorized based on frequency of symptoms
Asthma : Tx	1. Assess airway patency & resp status 2. Admin humidified o2 3. Admin rescue meds 4. Start an IV line ● Quick relief meds (rescue inhaler - albuterol or xopenex) ● Long term control: corticosteroids (oral or inhaled) - Leukotriene inhibitor (singulair) ● Allergy meds
Asthma : Goals	Maintain normal activity lvls & pulmonary function Prevent chronic symptoms & recurrent exacerbations Self management w/ asthma action plan
Cystic Fibrosis	Exocrine gland dysfunction w/ multisystem involvement Autosomal recessive Accumulation of Chloride → Increased mucous viscosity mostly in resp tract and pancreas
Cystic Fibrosis **S&S**	Resp: wheezing, progressive pulmon disturbance, COUGH, clubbing, barrel chest GI tract: meconium ileus (**obstruction**), abd distention, vomiting
Cystic Fibrosis **Dx**	Elevated sweat electrolytes (sweat chloride ^2-5x) Chest x-ray Pulmon function test
Cystic Fibrosis **Tx**	Postural drainage / percussion therapy Bronchodilators Expectorants Aggressive tx for pulmon infections*** (aerosolized ABX) Replace pancreatic enzymes before ALL MEALS - ^protein/calorie diet + liposoluble vitamins + vit C
Tuberculosis	Caused by Mycobacterium tuberculosis. Transmitted via inhalation of droplets (**AIRBORNE PRECAUTIONS - n95 mask & isolation**!!!) **Assessment**: fever, cough <3 weeks, night sweats, weight loss TB skin test: child >4yo induration >15mm = positive Child <4yo induration >10mm = positive High risk (immunosuppressed) >5mm = positive **Interventions:** Isoniazid 9 months (12 for HIV child) ● or Rifampin + Pyrazinamide for 2 months, then iso + rip 2x weekly for 4 months

Pediatric10

<table>
<tr><td colspan="2">Peds- Integument
The nurse is monitoring a child with burns for shock. Which assessment is <u>most</u> accurate to determine adequacy of fluid resuscitation?
● neuro assessment (over skin turgor & peripheral pulses)
Burns in the pediatric patient can result in:
● delay in growth, increased risk for infection, increased risk of protein/calorie deficiency</td></tr>
<tr><td>Eczema (atopic dermatitis)</td><td>Major goals are to relieve pruritus, lubricate skin, reduce inflam & control secondary infection
Interventions: avoid irritants: soap, detergent, fabric softeners
● Intermittent cool wet compress, pat skin dry
● Place gloves or cotton socks over hands</td></tr>
<tr><td>Impetigo</td><td>Contagious strep/staph, most commonly around the mouth, neck, hands
● Lesions progress to exudative crusts.
<u>Nrsng</u>: Contact & standard precautions. Assist with antibacterial soap as prescribed. Infections for 48 hrs after start of ABX.
<u>Teaching</u>: prevent spread by careful handwashing. Children need to use separate towels. All linens should be washed separate from others</td></tr>
<tr><td>Pediculosis capitis (lice)</td><td><u>Presentation</u>: excessive scalp scratching. Nits (white eggs) observable on hair shaft. Transmitted by direct & indirect contact (brushes, hats.. etc)
<u>Intervention</u>: permethrin 1%, repeat in 7 days if nits are still present
<u>Nrsng</u>: all contacts should be examined & treated. Use pediculicide as prescribes. Bedding should be laundered daily with hot water for 1 week.</td></tr>
<tr><td>BURNS</td><td>Steps to take in Burn Injury
1. Stop the burning process
2. Assess ABC’s
3. Begin resus if child not breathing
4. Remove burned clothing / jewelry
5. Cover wound with clean cloth (prevents contamination, reduces pain from air contact, prevents hypothermia)
6. Keep child warm
7. Transport to ED
Infants @ increased risk of protein/calorie deficiency (less muscle mass & less fat reserves)
Fluid Resuscitation = monitor vitals, UOP, Cap Refil.</td></tr>
<tr><td colspan="2">Peds - Hematological
Just a note: the coombs test is done on the mother to determine Rh factor
● Decrease in erythrocytes: anemia
● Decrease in leukocytes: leukopenia - associated w/ ^ risk of infection
● Decrease in thrombocyte: thrombocytopenia & ^risk of bleeding
● ^prod of erythrocytes: polycythemia
● Red Bone Marrow = myeloid tissue
- The nurse educated parents to administer iron supplements: through a straw to avoid staining</td></tr>
</table>

teeth, and in between meals to increase absorption (needs high acid in duodenum)	
Lymphoproliferative diseases	Hodgkins: lymph nodes contain Reed-Sternberg cells Non-Hodgkin's: all lymphoid cancers that don't contain Reed-Sternberg Leukemia: overprod of lymphocytes in lymph nodes Lymphosarcoma: abd proliferation of cytes or blasts in lymph nodes
Fe Deficiency Anemia	**Causes**: Inadequate Supply, Impaired Absorption, Blood loss - Iron Inhibitors: phosphates/ oxalates/ gastric alkalinity - Malabsorption: lactose intolerance, inflam disease, chronic diarrhea **S&S**: pale, poor development, paresthesia, fatigue/dizziness, low H&H **Iron Rich Foods**: liver, egg yolk, broccoli, spinach **NRSNG:** encourage freq. Periods of rest, frequent turning, teach pt to take Fe supplement between meals & w/ Vit C <<<NOT MILK>>>
Sickle Cell Anemia	**Risk Factors**: heterozygous Hemoglobin S parents or African American ● Insufficient o2 causes cells to sickle & obstruct capillaries **Precipitating Factors**: dehydration, fever, stress **Nrsng**: maintain hydration, oxygenation & pain management Monitor for vaso-occlusive crisis: CVA, retinopathy, hematuria, dactylitis (painful hands/feet) ● Hydroxyurea: only FDA approved that increased HgbF. Decreases incidence of crises. ^risk of bone marrow depression ● Stem cell transplant: only curative therapy
β-Thalassemia	This is an autosomal recessive resulting in decreased hemoglobin synthesis, bone deformities, growth retardation & transfusion-dependent anemia. **Assessment**: frontal bossing (protruding frontal bone), maxillary prominence, wide set eyes & flat nose, hepatosplenomegaly, severe anemia **Interventions**: transfusion & monitor for reaction, monitor for iron overload.
Hemophilia	Most common abnormal lab result = prolonged PTT ● H. type A: most common, factor VIII deficiency. (1 in 5000) ● H. type B (christmas disease): Factor XI deficiency (1 in 50,000) Prolonged bleeding from anywhere in the body (SQ & IM most common) Hemarthrosis = NO passive ROM w/ active bleeds!!! Tx: Factor VIII concentrate, corticosteroids, DDAVP
Idiopathic thrombocytopenia purpura	Acquired hemorrhagic disorder. 1) excessive platelet destruction, 2) purpura, 3) normal bone marrow Tx: supportive, prednisone, IVIG (1st line)
Peds - Oncologic Disorders	

Leukemia	- Acute Lymphocytic Leukemia (75-80%) - Acute Myelogenous Leukemia (20-25%) Proliferating immature WBC's → decreased erythropoiesis, neutropenia, thrombocytopenia. Assessment: bone/joint pain, pathological fractures, ∆ to WBC count, +bone marrow biopsy Infection: most common sites are breaks in skin, respiratory tract, GI tract ● Maintain private room, thorough hand washing, strict aseptic technique, monitor vitals & assess urine for color/cloudiness ● Encourage TCDB, avoid unnecessary invasive procedures (IV, rectal temp) ● Instruct parents not to receive live vaccines (MMR, polio, varicella) **Bleeding**: measure abd girth, avoid injections, apply firm/gentle pressure after needle stick (10min), pad side rails & sharp corners, count **Nrsng**: manage/monitor ICP, protect from infection, protect bleeding
Acute Lympho (blastic) (cytic) Leukemia	Peak 2-3yrs, affects more caucasians, & males > females ● Anemia : fatigue ● Thrombocytopenia : gingival, cutaneous, or nasal bleeding ● Neutropenia: fever\ ● Bone pain: refusal to walk
Acute Myelogenous Leukemia	Over proliferation of granulocytes in myeloid = red bone marrow. ● Gingival hypertrophy, hepatosplenomegaly, chloroma (clumps of leukemic cells generally on skin / scalp.. Blueberry muffin appearance) ● 50% will have platelet <50,000
Hodgkins Disease	Stage 1-4. 1= limited to 1, 4= diffuse metastases Malignancy of lymph characterized by presence of Reed-Sternberg cells (nonfunctioning monocyte cells) Assessment: painless enlarged, firm nontender, movable lymph usually cervical or supraclavicular. Presents: persistent, nonproductive cough, SVC syndrome & JVD Interventions: radiation, chemo or combined.
Osteosarcoma	Most common bone cancer in children. Peak between 10-25 years. Distal femur is most common site. Assessment: localized pain, palpable mass, limp if able to bear weight Interventions: initial chemo, surgical resection to try to salvage limb, then amputation if unsuccessful.

Ped - Cardiovascular disorder

- The nurse is reviewing labs for a child suspected of having rheumatic fever. What lab value should the nurse lob for? **Anti-streptolysin O titer**
- What method is most appropriate to assess urine output in an infant?: **Weighing diapers**
- What is the most appropriate question to elicit in a child suspected of rheumatic fever?: **did the**

child have a sore throat or fever in last 2 months?	
Heart Failure	Most commonly caused by congenital heart defects (shunt, obstruction or combination of both) **Assess**: tachy everything, scalp diaphoresis, fatigue/irritability, weight loss **Interventions:** apical pulse for 1 minute & monitor for dysrhythmias. ● Elevate HOB ● cluster nursing care to promote sleep ● provide small frequent feedings to conserve energy & o2 supply ● Give Dig as prescribed *** SEE BELOW**** ● Give Furosemide & K supplements as prescribed.
Left vs right side failure	Left: crackles, wheeze. Cough. Dyspnea. Head bobbing. Nasal flaring. retractions & tachypnea ● Blood backing up into lungs, not perfusing periphery. Pulmonary HTN → cor pulmonale and eventual both sided failure Right: ascites, hepatosplenomegaly, JVD, oliguria, weight gain.
Digoxin	VERY RARE TO GET MORE than 0.05mg… **<u>question these orders</u>** Withhold for apical HR less than 90-infants, 70-children Question dose > 0.05mg Normal level is 0.5-2.0 Monitor serum K. competitive binding sites. low → toxicity (n/v, brady, neuro Δ's) ● Home care: admin 1 hr before or 2hr post meals. ● If dose missed >4hrs, give next dose at scheduled time. ○ If <4hrs, give immediately ● If child vomits dont admin 2nd dose.
Atrial Septal Defect	Most are asymptomatic **<u>Decreased CO</u>**: ↓peripheral pulses, hypotension, irritability, oliguria, tachy **Management:** cath lab closure or open repair (usually before school age)
PDA	Failure of shunt closure between aorta & PA → ^ pulmonary blood flow ● Machine-like murmur, SOB ● Widened pulse pressure & bounding pulses are usually present **Tx**: Indomethacin (prostaglandin inhibitor) → closure. Catherization.
Obstructive defects	**Pulmonary Stenosis** - RV hypertrophy, murmur **Aortic Stenosis** - exercise intolerance, chest pain, dizzy when standing ● TX for stenoses = valvotomy (palliative TX) ● A typical rumbling mid diastolic murmur is the hallmark of MS. Balloon mitral **valvotomy**, performed in the catheterization lab, is recommended for severe MS (Saxena, Anita; Indian Journal of **Pediatrics**, Nov2015 - http://rdcu.be/rFQf) ● Surgical approaches for CHD: and update on success and challenges

	○ http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=&AN=00008480-201310000-00007&PDF=y **Coarctation of Aorta** - S&S of HF, headache, fainting & epistaxis from HTN (narrowing after arch, ^BP in upper extremities, lower BP in lower extremities)
Tetralogy of Fallot	Overriding Aorta, Ventral septal defect, Right ventricular hypertrophy, Pulmonary stenosis **Symptoms**: hypercyanotic episodes, FTT, murmur **Tx**: **Palliative shunt** → ^pulmon blood flow by anastomosing R or L subclavian artery to pulmon artery. **Complete repair**: w/in 1st year of life, child is put on ECMO (extracorporeal membrane oxygenation)
Nursing Interventions for CV defects	Monitor breathing for impending resp distress ● accessory muscles, crackles, ^effort For Hypercyanotic spells: 1. Place infant in knee-chest position 2. Admin 100% o2 3. Admin morphine 4. Admin IV fluids 5. Document occurrence, actions, & infant response Obtain Daily weights Cluster care to allow for maximal rest & stress free environment
Nursing Care for Atrial Catherization	Obtain Hx for allergies, esp **Iodine** Assess & mark bilateral pulses Posterior Tib & Dorsalis Pedis pre & post Monitor vitals q15min 4x, q30min 4x, q1h 4x. If bleeding is present, apply continuous direct pressure
Kawasaki Disease	Mucocutaneous lymph node syndrome → Acute systemic inflammation Primarily seen in children less than 5. **^risk of MI & coronary aneurysm is most serious complication.** Assessment: strawberry red tongue, fever, conjunctival hyperemia, swollen hands & lymph **Tx:** aspirin for antipyretic (80-100mg/kg/day) -- antiplatelet (3-5mg/kg/day) as prescribed, IVIG w/in 7 days **Nrsng**: notify hcp for temp ≥101. Aspirin toxicity = tinnitus, vertigo, bruising. Record temp until child is afebrile for several days.
Rheumatic Fever	***2-6 weeks post group A β-hemolytic strep infection. Affects joints, skin, brain, heart **Assessment**: carditis (mitral & aortic valves), rash, SubQ nodules near joints (arthralgia), chorea, erythema marginatum. ● Minor criteria are fever, arthralgia, ^ESR or CRP, <--> PR interval Tx: ABX, Anti-inflam (aspirin) as prescribed for joint pain. Heat & cold packs for joint pain too.

Peds - Neuro

The Nurse notes an elevated ICP following insertion of a ventriculoperitoneal shunt, what is the nurse's first action?

- **Elevate HOB 15-30 degrees, then notify HCP**

The nurse documents a child is exhibiting a +Kernig sign, what is this?:

- **child is unable to extend leg when thigh is flexed at hip**

An 8yo child has a basilar skull fracture. Which prescription should the nurse question:

- **Suction as needed**

A child is diagnosed with Reye's syndrome, what intervention should the nurse include in their plan of care?:

- **Decrease stimuli to decrease ICP and cerebral edema**

A child is diagnosed with hydrocephalus. What is priority PreOp nursing care?

- **reposition frequently** (can quickly develop pressure ulcers, use egg crate mattress under head)

Pupils	**Unilateral fixed**: lesion on same side **Dilated/non-reactive**: hypothermia, anoxia **Pinpoint**: poisoning **Widely dilated**: after seizure, eye trauma **Widely dilated & fixed**: paralysis of CNII, pressure from herniation **Conjugate**: paired working together,movement of eyes in direction opposite head rotation **Hippus**: rapid dilation, contraction of the pupil
Normals	Autoregulation for Δ's in BP or CO_2 will result in Δs in vessel size ● CO_2 → dilation (13.8% change in mean CBFV per 1mmHg change in end-tidal CO2) - "We reported children 6 months – 2 years to have a lower limit of cerebral autoregulation of 60 ± 9 mmHg [64]. This is important because tolerating lower blood pressure and therapeutic techniques such as deliberate hypotension in young children may not be appropriate and, in fact, result in cerebral ischemia." [2] - "The continuous increase in CBF volume after the sixth month of life mainly corresponds to brain growth. Estimated CBF (based on estimated brain weights) increased from 21 and 23 mL 100 g^{-1} min^{-1}, respectively, after birth to 46 and 53 mL 100 g^{-1} min^{-1}, respectively, during the first 6 mo of life in both children, remaining stable thereafter. [3] ICP: 0-15mmHg Cerebral Perfusion Pressure: 60-100mmHg ● MAP - ICP …. With brain injury you want >70 **Monro-Kellie doctrine:** ^ in any one component (brain tissue, blood, CSF), others must compensate to maintain normal ICP

[2] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2330089/ <<**Cerebral Blood Flow and Autoregulation after Pediatric Traumatic Brain Injury**

[3] http://www.nature.com/pr/journal/v66/n5/full/pr2009251a.html <<A Longitudinal Study of Cerebral Blood Flow Over the First 30 Months

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Cerebral Blood Flow	~15% of total CO ● first week of life: 60-80mL/min, 3yr old: 573 and 682 mL/min^2 ● posterior cerebral circulation = 31% in 3yr olds, 24% in adults^2 ○ (40–45%) were found at the end of the first year of life. In this period of life, locomotion and coordination are developing rapidly. If anoxic for >5min permanent necrosis results Carotid arteries (anterior circulation) Vertebral arteries (posterior circulation) ● Originate at subclavian artery & enter foramen magnum Cerebral Veins have no valves or muscle layers
Brain Stem	CN 3,4 - between diencephalon & pons. Auditory & visual reflexes Inferior & superior colliculi CN 5,6,7,8 - at the pons (controls rate & duration of respiration) CN 9,10,11,12 - medulla (regulates pulse rhythm, rate, str & Vasomotor. Sneeze, swallow, cough)
^'s of brain volume	Cerebral edema ● Cytotoxic: intracellular swelling of neurons, hypoxia/hypo-osmolality ● Vasogenic: ^cap permeability, tumors, meningitis
^'s of cerebral blood volume	Loss of autoregulation Decreased oxygenation Hypercapnia ^metabolic needs Venous obstruction
^' of CSF	Hydrocephalus ● Blockage of normal flow ● Obstruction of reabsorption ● Excess production of fluid
Types of Drains	**Ventriculostomy**: only type that <u>CAN DRAIN CSF</u> Epidural cath Subarachnoid Bolt
Head Injury	**Assessment**: ● Cushing's triad (irreg resp, <--> pulse pressure, BradyC) ● Bulging fontanel, ^head circumference ● Visual disturbances (diplopia), seizures **Interventions**: ● Monitor Airway, admin o2 as prescribed ● Position head midline to promote drainage, decrease stimuli ○ Assess drainage for halo or glucose → notify HCP if **+** ● Seizure Precautions: ○ Raise and pad side rails, instruct child to wear/carry MedID

	● Maintain NPO Brain Stem involvement = deep, rapid, or intermittent respirations. Fluctuating pulse. Unequal or sluggish pupils
Hydrocephalus	Imbalance of CSF absorption/production. Communiating = CSF isnt being reabsorbed Non-Communicating = blockage of flow somewhere **Assessment**: can present same as head injury **Interventions**: Surgical implant of VP shunt. **PreOp** Care: reposition head frequently to prevent pressure sores **PostOp** Care: position on unoperated side, elevate HOB 15-30* to promote drainage, measure head circumference & monitor I&O ● High shrill cry can be sign of ^ICP in infant
Meningitis	Dx made by testing CSF via lumbar puncture. **Assessment**: fever, chills, nuchal rigidity, poor/high shrill, ALOC, joint pain + Kernig (inability to extend leg when leg is flexed @ hip) + Brudzinski's (neck flexion causes adduction & flexion of lower extremities **Interventions**: respiratory isolation for ≥24hrs. Admin ABX & antipyretics.
Reye's Syndrome	Acute encephalopathy following viral illness. Cerebral edema & fatty Δ's in liver. Definitive Dx made by liver biopsy. ● Admin of **aspirin** containing products not recommended for febrile children ○ Ibuprofen may be prescribed **Assessment**:Hx of systemic viral illness 4-7 days prior, fever, N/V ● Progressive neuro deterioration, altered hepatic function (LABS) **Intervention**: Monitor bleeding (prolonged PTT) & liver labs
Cerebral Palsy	Impaired motor & posture from abnormality in Pyramidal motor system **Assessment**: ● abnormal posturing such as opisthotonos (exaggerated back arching). ● Feeding difficulties ● Delayed dev milestones **Intervention**: goal is early recognition & intervention to maximize abilities ● Studies on brain cooling w/ water filled cap has shown babies with severe initial neurological damage measured with an EEG cerebral function monitor showed ~ 20% reduction in death & disability & ~30% reduction by 18 months ● Mobilization devices (crutches / walkers) ● Meds : Baclofen / Diazepam ● Multidisciplinary care focused on family education & support
Neural Tube Defects	Failure of neural tube to close during development Spina bifida: posterior vertebral arch fails to close in lumbosacral area Meningocele: protrusion involving meninges in saclike cyst

	Myelomeningocele: protrusion including meninges, CSF, nerve roots, & spinal cord. Neuro deficits are evident **Assessment:** ● flaccid paralysis of legs ● Altered bladder/bowel functions ● Hydrocephalus **Interventions:** ● Aseptic technique ● Protect sac as prescribed (cover w/ sterile moist {NS} non-adherent dressing) ● Place in prone position to minimize tension on sac w/ head turned to one side for feeding ● Diaper usually contraindicated until after repair
ADHD	inappropriate degree of inattention, overactivity, impulsivity **Assessment**: ● Fidgeting, poor attention span, interrupts, talks excessively **Interventions:** ● Behavioral therapy focused on undesirable habbits ● Medication (methylphenidate) ○ SE: appetite suppression, weight loss, nervousness, insomnia
Peds - Musculoskeletal	
Developmental Hip Dysplasia	Femoral head is seated improperly in acetabulum **Assessment**: ● Infant: shortening of limb, restricted abduction, unequal gluteal fold, + ortolani (click felt on manual hip roll) **Interventions**: ● Birth - 6 months: Pavlik harness to maintain flexion, ABduction, & external rotation ● 6-18 months: spica cast until hip is stable.
Congenital Clubfoot	Ankle & foot adduction & supination (ankle has outward roll). Unilater or bilateral **Interventions**: serial casting (8-12 weeks). ● Monitor for compartment syndrome.
Marfan Syndrome	Connective tissue disorder affecting skel, cv, eye, skin in which elastic fibers aren't made in the extracellular matrix resulting in pathological weakening of the tissue **Interventions**: monitor for vision problems, spine curvature. Instruct parents to *inform dentists of condition, ABX needed before procedures* to prevent endocarditis. ● Most serious complications mitral valve prolapse, aortic aneurysm
Juvenile Arthritis	Autoimmune inflam disorder. No CURE

	Assessment: stiffness worse in morning, swelling, limited ROM, lymphadenopathy, splenomegaly, hepatomegaly, **Interventions**: NSAIDS (1st line). Methotrexate used if NSAIDs are ineffective. Corticosteroids admin at lowest dose possible for shortest time (needs tapering off). ● Tumor necrosis factor receptor inhibitors = Etanercept ● Antirheumatic Drugs: Sulfasalazine Assist child w. ROM exercises. Warm/Hot moist packs for chronic stiffness
Osteomyelitis	**Assessment**: pain, irritable, localized tenderness, no wt. bearing, ^ESR, Interventions: ABX, Pain control,
Legg-Calve Perthes	Self limiting disease.decreased circulation to femoral cap epiphysis → head necrosis **AVASCULAR STAGE**: aseptic necrosis or infarction with degenerative changes **FRAGMENTATION or REVASCULARIZATION STAGE**: bone absorption & revascularization **REPARATIVE STAGE**: new bone forms **REGENERATIVE STAGE**: femoral head reforms **Assessment**: limp, ache, soreness, decreased ROM **Interventions**: non-weight bearing, rest, pain mgmt